WHAT IS CLAIMED IS:

1. A method of increasing capacity in a transmission system using parallel waveforms, comprising several transmitters and at least one receiver, where the transmitters do not share the same frequency and where a frequency offset may appear between them, wherein the method comprises at least the following steps:

modeling the signal y as follows

$$\circ \quad \mathbf{y} = \begin{bmatrix} \mathbb{H}_1^1 & \cdots & \mathbb{H}_{N_{sp}}^1 \\ \vdots & \ddots & \vdots \\ \mathbb{H}_1^{N_{sp}} & \cdots & \mathbb{H}_{N_{sp}}^{N_{sp}} \end{bmatrix} \mathbf{a} + \mathbf{b} \qquad (2)$$

where $\mathbb{H}_i^j$ $(j \,{}^{\prime}\, i)$ is the channel matrix representing the interference received on the sub-carrier j of the symbols borne by the sub-carrier i, and

detecting the different symbols sent by different transmitters that have frequency offsets.

2. The method according to claim 1, comprising estimating the frequency differences of the different transmitters relative to the reference of the receiver and computing the inter-sub-carrier and inter-user matrix.

3. The method according to claim 1, wherein the waveforms are non-circular modulations such as CPM or BPSK modulations.

4. A device to increase capacity of a transmission system using parallel waveforms, the device comprising several transmitters and a receiver, where the transmitters do not share the same frequency and where a frequency offset can appear between them, wherein the receiver is adapted to:

determine the signal y expressed in the form

$$y = \begin{bmatrix} \mathbf{H}_1^1 & \cdots & \mathbf{H}_{N_{sp}}^1 \\ \vdots & \ddots & \vdots \\ \mathbf{H}_1^{N_{sp}} & \cdots & \mathbf{H}_{N_{sp}}^{N_{sp}} \end{bmatrix} a + b \qquad (2)$$

where $\mathbf{H}_i^j$ ($j \neq i$) is the channel matrix representing the interference received on the sub-carrier j of the symbols borne by the sub-carrier i, and

detect the different symbols sent by different transmitters that have frequency offsets.

5. The device according to claim 4, wherein the waveforms are one of non-circular CPM and BPSK modulations.

6. The method of claim 2, wherein the waveforms are non-circular modulations such as CPM or BPSK modulations.